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Urban Close Air Support

By

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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Urban Close Air Support

Thesis: The ability to conduct close air support in urban environments is a critical warfighting capability driven by the likely nature of future conflict and emerging service doctrine.

Abstract

During the six years since Desert Storm, the media has gone to great lengths to portray the technological mastery of U. S. air power. News videos and television documentaries have fired a barrage of stories of how high-tech weaponry enabled "surgical" strikes that won the war. Perhaps the wrong lessons have been taught too well, however. Future conflict and changing doctrine will likely pit pilots in a mission vastly different from the deep air strikes flown into Iraq. This paper looks at the need to conduct close air support in urban areas; a mission driven by the likely nature of future war (or potentially operations other than war) when married with warfighting doctrine that relies heavily on air support as a means of massing fires. Though the necessity to fight and win in any environment at any level may seem obvious, training and weapon procurement programs do not represent a future capability in urban close air support. For combatant commanders, operational success will depend on this and other critical tactical capabilities. They must, therefore, ensure that training and the planning, programming and budgeting system produce the proper warfighting tools.

In March 1997, President Slobodan Milosevic refused to acknowledge and accept the most recent elections. Rioting and factional rifts intensified and eventually broke down an already fragile peace in Serbia. Milosevic successfully surrounded himself with hard-line Serbs and began to arm and rebuild a Serbian army. Fearing a rapid build-up of UN forces and knowing that they can eventually be out-gunned, the Serbs consolidate their position politically and geographically by moving into Belgrade. In doing so, they gained an immediate tactical advantage for a renewed civil war that would be their last chance to consolidate power in the former republic.

With UN support, the NCA determined that time was essential and that the Serb uprising must be quailed before their defensive positions could be strengthened and large scale civil war again erupted. CINCEUR put into motion the contingency plans for Serbia as diplomatic channels pressed for a negotiated settlement through the UN. Tension mounted daily and Serbia again became front page news throughout the globe.

Within days of the initial Serbian revolt, U. S. troops began fighting their way into Belgrade. Movement and maneuver were hindered by the rubble and narrow streets of the ancient city. With only a few well placed sniper and direct fire anti-armor teams, the Serbs tied up a much superior force and gained bargaining power with each passing moment. For the first time since Seoul, Korea in 1950, U. S. troops found themselves bogged down in clearing operations in a dense urban environment where progress is measured room by room.

The world watched closely; perhaps less interested in the outcome, considered a foregone conclusion, than in how the operation was conducted and the burden placed on beleaguered inhabitants of former Yugoslavia. CINCEUR, painfully aware of political and media pressure, realized that the situation could not be allowed to deteriorate. Decisive fire power must be brought to bear quickly and precisely.

Air power is the answer, right? The U. S. has shown the capacity time and again to conduct precision strikes against urban targets, most recently in Libya, Lebanon, Grenada and Iraq. Desert Storm proved to the world that the U. S. could strike almost any target with discrimination and devastating results. Certainly this would be no different.

The original goal of this research was to document an imbalance that appears between actual capability and anticipated requirement to conduct close air support (CAS) in urban environments. Anticipated conclusions were: (a) pilots do not train to do urban CAS, (b) current CAS procedures and air control architecture do not support CAS in some urban environments and (c) a new family of weapons is necessary for urban CAS. However, research yielded a surprisingly scarce amount of information on tactics, techniques and procedures (TTP) specific to urban CAS. Discussion of the topic with some military historians, researchers and War College students more often than not

prompted a response of varying degrees of indifference. Furthermore, the direction and philosophy of current weapons procurement seem to indicate apathy for the idea that CAS in terrain as confining as an urban landscape will be required in the future. Weapons are apparently developed with the goal of achieving one-round kills against targets of a particular type without regard to the environment or conditions under which the weapon may be used. At that point the real question seemed not the need for qualitative analysis of our ability to conduct urban CAS, but to determine whether or not that capability was even necessary, much less critical to warfighting doctrine. If so, what are the specific challenges and potential solutions? Or, can we naturally assume from recent success of air strikes in urban areas that we have the capacity to hit any target any time?

The scenario portrayed above is useful to point out the vast differences in conducting CAS in urban areas as opposed to the air strikes the likes of El Dorado Canyon or Desert Storm. Air operations in this scenario would be vastly different from those large scale, meticulously planned strikes. Targets maneuvering through the city, the imbedded nature of point targets within buildings, the close proximity of air strikes to friendly troops in combat and the weapons available would all be different. The difference, in short, is the contrast in close air support and deep air strikes (DAS). CAS rarely affords the target study, flexibility to chose specific flight profiles or coordinated air defense suppression that are integral parts of any DAS mission. The immediacy of CAS usually precludes target familiarization through study, its fire support coordination requirements mandate specific flight profiles and weapon release parameters and its proximity to troops restricts the types of weapons available. In fact, most CAS missions present pilots with a problem in which there are but a few moments to complete the final

attack plan in flight and for which successful execution depends on split second timing, total situational awareness in a hostile environment and identification of a target for which they have not seen imagery nor know its exact location. It is a mission with an intensely small margin for error and an absolutely unacceptable penalty for engaging the wrong target. The difficulty of the mission is exponentially magnified when targets are afforded the cover and concealment of city blocks and threat weapons systems are given the advantage of firing from roof tops.

In *Urban Offensive Air Support,* Major Jon M. Davis, USMC, reached the following conclusions after analysis of urban CAS requirements with respect to training and weapons:

1. Troop engagements in urban areas occur at much shorter ranges than in less confined areas. Direct fire weapons permit engagements of 2000 meters or more in rural areas with unrestricted fields of fire, whereas urban engagements may occur as close as 150 feet.[1] Thus, CAS weapons require controlled yield to permit use in such close proximity to troops. Additionally, a controlled yield will minimize rubble effect which impedes maneuver and provides cover and concealment to the enemy.[2]

2. CAS weapons and fuses must be carefully matched to the construction and density characteristics of particular urban areas.[3] For instance, old buildings of thick stone or concrete construction require penetration type weapons, but buildings of newer steel frame construction, industrial buildings or transportation centers may require more blast effect. To provide maximum mission efficiency and flexibility, pilots should have fuse options selectable from the cockpit.[4]

3. Current weapon procurement programs do not meet anticipated needs for urban CAS by fixed wing aircraft.[5] Joint Stand-Off Weapon (JSOW) and Joint Direct Attack Munition (JDAM) are incompatible with the CAS mission: JSOW because its baseline and BLU-108 variants are cluster munitions and its unitary warhead has prohibitive cost; JDAM because warhead sizes preclude use in close proximity to troops.[6]

4. "The current standard of training for urban [offensive air support] is poor."[7]

Each of these points is valid and timely. Major Davis' findings indicate that the U. S. military does not practice or equip itself for the peculiarities of applying air power in urban terrain in a close support role though the likely nature of future conflict, demographics and military doctrine clearly spell the need to do so.

In 1994, the United States Institute of Peace held a conference entitled "Managing Chaos: Coping with International Conflict into the Twenty-First Century" in which various view points on the nature of conflict in the next century were discussed.[8] Among panel members were four recognized authors concerning future conflict, G. M. Tamas, from the University of Budapest, Samuel P. Huntington, author of "The Clash of Civilizations?", Robert Kaplan, author of "The Coming Anarchy", and Jessica Mathews, senior fellow at the Council on Foreign Relations. Each of these conference contributors presented views on the underlying cause of instability; views that are at once both complementary and contrary, but seem to have a common thread.

G. M. Tamas proposed that a new wave of nationalism based on ethnicity will be the cause of future hostility. He observed that "the new, post-communist nationalism in Eastern Europe is anarchistic, apolitical, and even antipolitical."[9] Tamas cited unrest in Serbia and even the 1992 riots in Southern California as examples of ethnic based nationalism.

Samuel P. Huntington referred to his theory on the clash of civilizations as the next cause of war. Huntington envisions conflict based on economic competition overlapped by "violence between states and groups from different civilizations." Of the two, violence

between different civilizations has the greater potential for escalation.[10] Huntington cites unrest in Serbia, the Caucasus, Central Asia and Kashmir as current clashes of civilizations.

Robert Kaplan agreed that economic competition will be a potential cause for war, but, unlike Huntington, sees it as the primary source. " ...violence in the world today is caused not by poverty and economic stagnation but by global economic success and development. ...[B]ut it has been uneven, and it is the unevenness that is causing the problems."[11] Kaplan painted a picture of mass migrations into urban areas by those seeking education and employment or escaping deforested and non-arable lands.

Jessica Mathews expounded on the underlying theme of overpopulation struck by Kaplan as a source for violence. According to Mathews, world population will double by 2050, giving rise to resource deprivation and an "unsatisfiable demand for jobs." Population growth "will result in an increase in internal migration and rapid urbanization, with concomitant internal political instabilities."[12]

So what is the point of all this? There are three facets common among these ideas that unified Commanders in Chief (CINCs) and planners of military capabilities cannot overlook. First, the examples cited by each speaker were global in nature, ranging from Eastern Europe to Egypt and sub-Saharan Africa to central Asia and the Middle East – even Southern California. Second, they do not point to major regional conflicts spurred by regional powers as a likely cause of future war. Kaplan specifically noted India and China as becoming less powerful and less relevant regionally. (The demise of these governments may have a destabilizing regional effect as did the fall of communism in Eastern Europe.) Third, urban areas will be the hotbeds. Cultural, ethnic and economic

centers, where competition for economic and military power among crowded ethnic or culturally based groups is the greatest, will be the most likely future battlegrounds.

As social science predicts urban conflict, military planners and authors of doctrine similarly expect to be engaged in urban warfare. The following statement from the draft management plan for Sea Dragon exemplifies the concern for asymmetric attack by an adversary weak in maneuver warfare.

> Urban conflict has a long and bloody history, and throughout the centuries has often proved to be one of the most costly and difficult forms of combat. With the inherent dangers of operating in closed and restricted terrain, the compounding factors of civilian non-combatants, and infrastructure, conducting operations in the urban environment presents the commander with a unique set of operational challenges. In the past 50 years, naval forces have responded to over 200 crises worldwide, many in urban environments. The lessons of Desert Storm were learned by both friend and foe alike, and the likelihood of a potential adversary opposing the U. S. in the manner of Saddam Hussein is remote. To oppose the U. S. at its strength is to ensure failure. More likely is the foe who will attack our vulnerabilities. Among these, is our limited ability to conduct operations in an urban environment.[13]

When combined with the expectation of urban conflict, examination of emerging doctrine also attests to the importance of having CAS available in urban terrain. Joint Vision 2010, the template for future force employment designed by the Chairman of the Joint Chiefs of Staff, Sea Dragon, the Marine Corps vision for force structure as well as equipment and TTP experimentation, and Force XXI, the Army's doctrine for the next century, all have as a common pillar the use of advanced technology to mass indirect fires at a decisive point without the force vulnerability created by massing ground troops. Two possible means to provide massed fires are available, artillery and air support. If one accepts the idea that the U. S. can no longer afford to turn towns into rubble to neutralize a point target, artillery can effectively be ruled out as a fire support agency for urban areas. Close terrain of built up areas presents numerous trajectory obstacles for artillery

fire along fixed gun-target lines and exacerbates collateral damage due to inherent inaccuracy, making air support the close support method of choice. Furthermore, a U. S. Army Training and Doctrine Command close support assessment states that current artillery development efforts are ill suited for close support targets.[14]

Thus, urban CAS is a critical aspect of our future warfighting capability. We must expect to fight in urban areas and doctrine demands that we be able to mass fire power with precision and speed. What, then, are the challenges to potent urban CAS? Before discussing specific limitations of urban CAS, common foundations must be laid and certain assumptions made -- most of which can be made with a fair degree of certainty.

For simplicity and brevity, urban areas will be characterized as one of two types, though urban areas can be classified into several categories based on construction type, street layout and building density. The first category is the "downtown" area characterized by high-rise buildings densely packed into an arrangement of city blocks; the next, industrial districts where road patterns are still dominated by, but not limited to, city blocks and buildings are primarily of low-rise construction, less densely crowded in any given area. Three basic assumptions will be made: first, rules of engagement (ROE) restrict operations to minimal collateral damage and the intent of that ROE is strictly adhered to; second, all prerequisites for effective CAS are met, cooperative weather, adequate suppression of enemy air defense (SEAD) and responsive command and control procedures; and last, an enemy who chooses to defend from an urban environment does so because of the distinct advantage it provides and will fight with resolve. Though adequate SEAD is a given factor, it can never be assumed that an air defense system will be completely reduced. This discussion assumes an air defense system of anti-aircraft

artillery (AAA) and a mixture of shoulder fired infrared (IR) surface-to-air missiles (SAMS) and radar guided SAMS.

The successful formula for CAS in any terrain is bringing together the correct weapon guidance and trajectory, plus an effective warhead and fuse combination. Urban terrain tends to negate one or more of these critical factors in most every circumstance, particularly in a dense area. In downtown areas the most difficult of these factors to solve is trajectory. Buildings of only moderate height create a series of deep, narrow canyons with sheer vertical walls, making almost impossible attack of a target anywhere along the face of a building with today's fixed wing free-fall munitions because of their shallow convex trajectory. Current generation air-to-ground missiles for fixed wing aircraft offer little improvement due to the slow speeds of these weapons. Though precision guidance techniques (laser and infrared) are available in a number of CAS weapons (e.g. Maverick and various LGBs), weapon trajectory makes them practically useless in urban terrain except for point targets located in streets. (TV guidance is available in Walleye, but warhead size makes it impractical for CAS use.) In those cases, targets must be engaged from attack headings along the axis of the street, profiles that put friendly troops at considerable risk because a weapon has to be released so that it flies either directly at or over them. Guidance failures or interruptions (caused from smoke, dust, weather, etc.) can cause the weapon to fly long or short producing friendly fire casualties. Laser guidance, the most common technique for precision attack, can be especially hazardous. Laser guided munitions must be released from behind the laser source to prevent the weapon's seeker from locking on and guiding to the laser source. Yet, even when laser guided weapons are released behind the laser source, particulate matter in the air

immediately in front of the laser, such as dust or moisture, can create sufficient laser reflection so that the weapon still guides to the laser source. This phenomenon has occurred in peace time training and cost at least two lives.

Rotary wing platforms offer an advantage to solving the trajectory puzzle; but, holding to the aforementioned assumptions, the risk in performing CAS in downtown areas is prohibitive. If a helicopter drops into a city "canyon" to deliver ordnance, it loses maneuverability; remaining above roof top level deprives it of concealment. In either case, it becomes extremely vulnerable to AAA, IR SAMS and shoulder fired rockets. Shootdowns in Mogadishu on 3 October 1993, evidenced the vulnerability of rotary wing aircraft to even unsophisticated weapons in an urban environment which was much less confining than a high-rise area.

Industrial areas are a portion of the urban environment where the U. S. currently enjoys an effective capability. The congestion of buildings is not as dense and the canyons are not as deep. Weapon trajectory is not as critical a factor, allowing attacking aircraft more flexibility in attack profile in relation to friendly troop positions and making guidance a much easier problem to solve. However, failure to retain proper warhead and fuse combinations will, nevertheless, negate the capability now present. As stated above, JDAM and JSOW, primary weapon projects for both the Air Force and Navy, are not compatible with the CAS mission, although JSOW is intended to replace weapons that are currently the most capable CAS weapons in the inventory (GBU-12, a 500 pound laser guided bomb, and Maverick).[15]

Possible solutions to the guidance-trajectory-warhead dilemma lie in technologies that are being tested as concept demonstrators. First is the Enhanced Fiber Optic Guided

Missile (EFOG-M), a TV guided missile that allows in-flight human guidance inputs via fiber optic data link.[16] The projected range and mobility of this system may reduce much of the need for CAS once combat operations are sustained ashore[17]; but in the urban littorals, CAS will remain the primary means of close fire support. An air delivered fiber optic munition could eliminate a fixed trajectory by allowing aircrew or forward air controllers (FACs) to drive the weapon to the target regardless of urban obstructions, much like the delivery of a data link Walleye. This system would, however, require extensive advancement in the use of unmanned aerial vehicles (UAVs) as data link relay platforms to close the data link loop from pilot to FAC to weapon.

A second possible system for urban CAS lies in the further development of hypersonic missiles. Hypersonic weapons would provide a flat, instantaneous trajectory giving aircraft a true point and shoot capability that would permit pilots to attack targets in urban "canyons" from any angle. Additionally, hypervelocity may aid in solving penetration and explosive yield problems that JDAM and JSOW do not adequately address.

What does this mean to a CINC? Why should he be concerned with a tactical ability that may constitute but a portion of an operation or campaign? Two overriding points bring a CINC's interest not only to urban CAS, but to any warfighting capability deemed critical to success. First is the primacy of the CINC's mission to fight and win wars and the implications of tactical operations in operational art.

"Being ready to fight and win the Nation's wars remains our foremost responsibility..."[18]

"Although *promoting stability* takes much of our day-to-day time, *thwarting aggression* is our most important overall objective...(original emphasis)

"Maintain the ability to fight and win decisively..."[19]

In today's environment tactical success is required for operational success. History gives a few examples of victors losing battles yet winning the war, but only with the luxury of time – a luxury the U. S. may not have when faced with the possibility of near simultaneous major regional contingencies.

CINCs must have the correct tools at each level of war to enact successful operations and campaigns. His method of assurance that those tools are available is the second point that draws a CINC's attention to the tactical level, the Planning, Programming and Budgeting System (PPBS). Through the various review processes and documents produced by the PPBS, combatant commanders have direct input to national defense strategy, force structure requirements and programming guidance from which Defense Departments and agencies develop Project Objective Memoranda. The PPBS's "ultimate objective is the acquisition and allocation of resources to meet the warfighting needs of the combatant commanders."[20] CINCs should proactively engage the PPBS to ensure their warfighting arsenal includes the capability for urban CAS.

From the American Revolution to Vietnam , American military preparedness between wars has been, at best, an inconsistent struggle to keep weapons and doctrine appropriate for the next conflict. Inter-war activities are "dictated largely by peacetime needs, not by wartime probabilities."[21] In defeat and in victory America's first battles have been too costly.[22] The likely nature of future conflict mandates that we be prepared to conduct urban warfare with swiftness and decisiveness. Our doctrine demands rapid, precise fire power. Since Desert Storm, U. S. military leaders have made concerted efforts to harness the power of the technological revolution to keep warfighting

capabilities timely and relevant. To neglect development of urban CAS tactics, techniques and procedures will be to fall back into a perilous pattern.

NOTES

[1] Major Jon M. Davis, "Urban Offensive Air Support: Is the United States Military Prepared and Equipped?", Unpublished Research Paper, U. S. Marine Corps Command and Staff College, Quantico, VA: 1995, 98.

[2] Ibid., 56, 82.

[3] Ibid., 80.

[4] Ibid., 93.

[5] Ibid., 82.

[6] Ibid., 87-88.

[7] Ibid., 94.

[8] United States Institute of Peace, "Sources of Conflict, Highlights from the Managing Chaos Conference." n. d. <gopher://gopher.ipc.apc.org:7001/00/usip.pubs/17> (17 January 1997).

[9] Ibid.

[10] Ibid.

[11] Ibid.

[12] Ibid.

[13] Commandant's Warfighting Laboratory, *Management Plan for the Sea Dragon Advanced Technology Concept Demonstration* Draft, (Marine Corps Combat Development Center, 1 April 1996), 5-6.

[14] U. S. Army Training and Doctrine Command Analysis Center, *Joint Close Support End-to-End Assessment* Draft, (1 July 1996), 5.

[15] U. S. General Accounting Office, *Weapons Acquisition: Precision Guided Munitions in Inventory, Production, and Development*, Report to Congressional Committees (Washington: 1995), 36.

[16] Ibid., 24.

[17] The Enhanced Fiber Optic Guided Missile system is a U. S. Army advanced technology demonstrator. The system uses a fiber optic data link that allows the gunner to look through the missile seeker and provide in-flight guidance commands. The system tauts a range of 15 kilometers and circular error probable of .5 meters. Launcher mobility is provided by a high-mobility wheeled vehicle.

[18] Chairman of the Joint Chiefs of Staff, *Joint Strategic Capabilities Plan* (Instructional), CJSCM 3110.01 (Washington: 20 Dec 1995), B-5.

[19] "USEUCOM Theater Strategic Objectives." *EUCOM Stategy.* n. d. <http://199.56.154.3/library/sep/sep03.html#PROMOTING_STABILITY> (17 January 1997).

[20] Joint Chiefs of Staff, *Doctrine for Planning Joint Operations*, Joint Pub 5-0 (Washington: 3 April 1995), II-5.

[21] Heller, Charles E. and Stofft, William A. *America's First Battles 1776-1965*, (Lawrence, KS: University Press of Kansas 1986), 331.

[22] Ibid., 329.

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